

REMARKS

Reconsideration of the October 7, 2003, Final Official Action is respectfully requested. Claims 1-4, 6-12 and 14-25 are pending in the application for the Examiner's review and consideration.

By this Amendment, Claims 5 and 13 have been canceled and Claim 1 has been amended to incorporate the subject matter of Claim 13. Specifically, the plasma etch reactor of Claim 1 is now defined as "a capacitively coupled plasma reactor having a powered showerhead electrode and/or a powered bottom electrode, the showerhead electrode being supplied 0 to 3000 watts of RF energy and the bottom electrode being supplied 0 to 3000 watts of RF energy."

First Rejection

Claims 24 and 25 were rejected under 35 U.S.C. § 112, first paragraph, for allegedly containing subject matter not described in the specification. In the Official Action, the following position is taken:

Claims 24-25 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter, which was not described in the specification.

In claim 24, "the etchant gas consists essentially of a hydrogen-free fluorocarbon gas, an oxygen-containing gas and optional carrier gas" is new matter because "consists essentially of" excludes other materials. The instantly claimed invention does not have this negative limitation in the disclosure. Furthermore, the disclosure sets forth the C_xF_y is at least C_4F_6 (page 6 of the specification, line 8).

In claim 25, "the etchant gas consists of a hydrogen-free fluorocarbon gas, an oxygen-containing gas and optional carrier gas" is new matter because "consists essentially of" excludes other materials. The instantly claimed invention does not have this negative limitation in the disclosure.

Furthermore, the disclosure sets forth the C_xF_y is at least C_4F_6 (page 6 of the specification, line 8).

Official Action, paragraph 1, page 2.

This rejection is respectfully traversed on the basis that a similar rejection was reversed in Ex parte Ellul, Appeal No. 1997-4412 (See USPTO official website <http://www.uspto.gov/web/offices/dcom/bpai/decisions/fd974412.pdf>). Ex parte Ellul was an appeal of the final rejection of certain claims reciting "consisting essentially of" polyolefin and plasticizer. The examiner stated that the specification is directed to a blend of a polyolefin and a rubber taken together with a plasticizer. The examiner concluded that no support existed for a composition "consisting essentially of" a polyolefin and a plasticizer.

The Board found that the paragraph bridging pages 6-7 of the specification provided polyolefin and plasticizer and held that the subject matter of the two components was supported by this description. In view of this, the Board found that appellant was in possession of the invention as claimed, and hence reversed the 35 U.S.C. § 112, first paragraph rejection.

Moreover, the terminology "consists essentially of" in Claim 24 or "consists of" in Claim 25 relates to "transitional phrases" used to define the scope of a claim. See MPEP §2111.03 "Transitional Phrases." Given the explanation of the definition of such phrases in the MPEP, it is submitted that there is no need for such terms to be discussed in the specification.

Claim 24 is directed to an etchant gas consisting essentially of a hydrogen-free fluorocarbon gas, an oxygen-containing gas and a optional carrier gas. Claim 25 is directed to an etchant gas consisting of a hydrogen-free fluorocarbon gas, an oxygen-containing gas and a optional carrier gas.

Support for the claimed hydrogen-free etch gas can be found in the specification as follows:

Especially good selectivity of oxide to nitride can be obtained when the etch gas is free of hydrogen and/or nitrogen. (Emphasis added, page 17, lines 19-20.)

The fluorocarbon is preferably hydrogen-free and may comprise at least one C_xF_y gas... (Emphasis added, page 18, lines 20-21.)

According to the invention, oxygen is added in an amount effective to control the etch rate selectivity of the etching gas chemistry. That is, the oxygen is effective to prevent etch stop by reacting with polymer at the bottom of the etched openings. The advantageous effects of the invention can be achieved by supplying the oxygen reactant and fluorocarbon reactant to plasma etching reactor at a flow rate ratio of oxygen reactant to fluorocarbon reactant of 1.5 or less. For selective etching of BPSG in a medium density plasma etch reactor, the flow rate ratio of oxygen reactant to fluorocarbon reactant is preferably 0.5 to 1.2...[t]he etching gas mixture may optionally include other gases and/or an inert carrier gas such as argon (Ar), helium (He), neon (Ne), krypton (Kr), xenon (Xe) and mixtures thereof. (Emphasis added, page 18, line 12 through page 19, line 3.)

The process of the invention is useful for obtaining extremely high dielectric:nitride etch selectivity of at least 10:1...For example, etching of a BPSG layer can be carried out for about 1 minute in a single step with... 260 sccm Ar, 12 sccm O_2 , 11 sccm C_4F_6 . (Page 20, lines 9-21).

From the foregoing excerpts and examples from the specification, Applicants respectfully submit that the subject matter of Claims 24-25 does not introduce any new matter, nor does the use of the transitional phrases introduce any new matter. See Ex parte

Ellul, supra. The specification clearly discloses a hydrogen-free etch gas and provides an example of an etch gas that consists of C_4F_6 (a hydrogen-free fluorocarbon), oxygen (an oxygen-containing gas), and argon (a carrier gas). Such a disclosure in the specification demonstrates possession of the etchant gas recited in Claims 24 and 25. In view of the entire specification, Applicants have demonstrated possession of the claimed subject matter recited in Claims 24 and 25. Thus, because the applicants have demonstrated possession of the claimed invention, i.e., an etchant gas that consists essentially of (or consists of) a hydrogen-free fluorocarbon gas represented by C_xF_y gas wherein $y/x \leq 1.5$, an oxygen containing gas, and a carrier gas, Claims 24 and 25 are adequately described and the 35 U.S.C. §112, first paragraph, rejection should be withdrawn.

Second Rejection

Claims 1-5, 9-12 and 14-25 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 6,174,451 to Hung et al. ("Hung") in view of U.S. Patent No. 6,074,959 to Wang et al. ("Wang"). The reasons for this rejection are set forth in numbered paragraph 3, on pages 3-7 of the Official Action. This rejection is now moot in view of the incorporation of the subject matter of Claim 13 into Claim 1.

Third Rejection

Claims 6-8 and 13 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Hung and Wang in further view of U.S. Patent No. 6,228,438 to Schmitt ("Schmitt"). The reasons for the rejection are set forth in numbered paragraph 4, on pages 7-8 of the Official Action. The Official Action alleges that Schmitt discloses a dual

frequency capacitively coupled plasma reactor including an upper showerhead electrode and a bottom electrode (See column 8, lines 1-10) and it is argued that it would have been obvious to modify the etch process of Hung and Wang to include other commercially available plasma etch reactors. Claim 13 has been canceled, but Claim 1 has been amended to incorporate the subject matter of Claim 13. As to Claims 7 and 8, the Official Action acknowledges that "[t]he combined prior art does not disclose the flow rate of oxygen (O₂) for the process" but alleges oxygen is a result-effective process variable. This rejection is respectfully traversed.

1 - Legal Standard for § 103 Rejection

Reconsideration of the rejection is requested in view of the following legal precedent regarding rejections based on a combination of prior art references.

According to MPEP § 2143, to establish a *prima facie* case of obviousness, (1) "there must be some suggestion or motivation, either in references themselves or in the knowledge generally available to one of ordinary skill in the art, to ... combine reference teachings"; (2) "there must be a reasonable expectation of success"; and (3) "the prior art ... references when combined ... must teach or suggest all the claim limitations". The Patent Office has the initial burden of establishing each of these requirements of a *prima facie* case of obviousness. In re Piasecki, 223 USPQ 785, 787 (Fed. Cir. 1984) and In re Warner, 154 USPQ 173 (CCPA 1967).

If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the

references are not sufficient to render the claims *prima facie* obvious. In re Ratti, 123 USPQ 349 (CCPA 1959).

Additionally, if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon, 221 USPQ 1125 (Fed. Cir. 1984).

2 - Claimed Subject Matter

Claim 1 is directed to a method of *etching a dielectric layer with selectivity to an underlying stop layer*, comprising (a) supporting a semiconductor substrate in a plasma etch reactor, wherein the plasma etch reactor is a capacitively coupled plasma reactor having a powered showerhead electrode and/or a powered bottom electrode, the showerhead electrode being supplied 0 to 3000 watts of RF energy and the bottom electrode being supplied 0 to 3000 watts of RF energy, the substrate including a dielectric layer over a stop layer; (b) supplying an etchant gas to the plasma etch chamber; and (c) etching openings in the dielectric layer by energizing the etchant gas into a plasma state, the etchant gas comprising a *hydrogen-free* fluorocarbon gas represented by C_xF_y gas wherein $y/x \leq 1.5$, an *oxygen-containing* gas and optional carrier gas.

Claim 7 depends from Claim 1 and further sets forth that the etchant gas is nitrogen-free, the C_xF_y gas is at least C_4F_6 , the oxygen containing gas is at least O_2 and the carrier gas is Ar, the etchant gas being supplied to the plasma etch reactor through a showerhead electrode at flow rates of 2 to 50 sccm C_4F_6 , 2 to 50 sccm O_2 and 50 to 800 sccm Ar.

Claim 8 depends from Claim 1 and further sets forth that the C_xF_y gas is at least C_4F_6 , the oxygen containing gas is at least O_2 and the carrier gas is Ar, the etchant gas being supplied to the plasma etch reactor through a showerhead electrode at flow rates of 10 to 25 sccm C_4F_6 , 5 to 20 sccm O_2 and 50 to 300 sccm Ar.

As set forth below, the combination of Hung, Wang and Schmitt fails to teach or reasonably suggest all of the claim limitations.

3 - The Etch Reactor of Schmitt is Unsuitable for Hung's Process

Regarding Claim 1, Hung relates to a process wherein a high-density plasma etch reactor is used (column 7, lines 33-48 and column 11, lines 1-10). In fact, Hung specifically recites that "[t]he high-density plasma is further important because it produces a higher fraction of ionized etching particles, which can be directed to the bottom of holes with high aspect ratio." Column 7, lines 45-48. Schmitt relates to a capacitively coupled RF plasma reactor which does not provide a high density plasma. The plasma reactor of Schmitt would be unsuitable for Hung's high-density plasma etch process because it would change the principle of operation¹ of Hung to use a capacitively coupled etch reactor to carry out the modified Hung etch process. Accordingly, because the proposed modification to Hung would change the principle of operation of Hung, the teachings of Hung, Wang and Schmitt are not sufficient to render the claims *prima facie* obvious. See In re Ratti, 123 USPQ 349 (CCPA 1959). Additionally, the proposed modification to Hung, using the non-high density capacitively coupled RF plasma reactor of Schmitt, renders Hung

¹ See MPEP § 2143.01 The Proposed Modification Cannot Change the Principle of Operation of a Reference.

unsatisfactory for its intended purpose². Thus, there is no suggestion or motivation to make the proposed modification. See In re Gordon, 221 USPA 1125 (Fed. Cir. 1984). As such, Claim 1 is patentable over Hung, Wang and Schmitt.

4 - Claims 7 and 8 Are Further Patentable

With regards to Claims 7 and 8, Applicants contend that the addition of oxygen to a hydrogen-free main etchant gas was not known from the teachings of Wang to achieve a recognized result and thus the amount of oxygen to add is clearly not a known result-effective variable. See In re Antonie, 195 USPQ 6 (CCPA 1977) (A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation). As such, Claims 7 and 8 are further patentable over Hung, Wang and Schmitt.

Fourth Rejection

Claims 1-5, 9-12 and 14-25 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 5,366,590 ("Kadomura") in view of Wang. The reasons for the rejection are set forth in numbered paragraph 5, on pages 8-12 of the Official Action. This rejection is now moot in view of the incorporation of the subject matter of Claim 13 into Claim 1.

Fifth Rejection

² See MPEP § 2143.01 The Proposed Modification Cannot Render the Prior Art Unsatisfactory For Its Intended Purpose.

Claims 6-8 and 13 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Kadomura and Wang in further view of Schmitt. The reasons for the rejection are set forth in numbered paragraph 6, on pages 12-13 of the Official Action. The Official Action alleges that Schmitt discloses a dual frequency capacitively coupled plasma reactor including an upper showerhead electrode and a bottom electrode (See column 8, lines 1-10) and argues that it would have been obvious to modify the etch process of Kadomura and Wang to include other commercially available plasma etch reactors. Claim 13 has been canceled, but Claim 1 has been amended to incorporate the subject matter of Claim 13. As to Claims 7 and 8, the Official Action acknowledges that "[t]he combined prior art does not disclose the flow rate of oxygen (O₂) for the process" but alleges oxygen is a result-effective process variable. This rejection is respectfully traversed.

1 - Claimed Subject Matter

Claim 1 is directed to a method of *etching a dielectric layer with selectivity to an underlying stop layer*, comprising (a) supporting a semiconductor substrate in a plasma etch reactor, wherein the plasma etch reactor is a capacitively coupled plasma reactor having a powered showerhead electrode and/or a powered bottom electrode, the showerhead electrode being supplied 0 to 3000 watts of RF energy and the bottom electrode being supplied 0 to 3000 watts of RF energy, the substrate including a dielectric layer over a stop layer; (b) supplying an etchant gas to the plasma etch chamber; and (c) etching openings in the dielectric layer by energizing the etchant gas into a plasma state, the etchant gas

comprising a *hydrogen-free* fluorocarbon gas represented by C_xF_y gas wherein $y/x \leq 1.5$, an *oxygen-containing* gas and optional carrier gas.

Claim 7 depends from Claim 1 and further sets forth that the etchant gas is nitrogen-free, the C_xF_y gas is at least C_4F_6 , the oxygen containing gas is at least O_2 and the carrier gas is Ar, the etchant gas being supplied to the plasma etch reactor through a showerhead electrode at flow rates of 2 to 50 sccm C_4F_6 , 2 to 50 sccm O_2 and 50 to 800 sccm Ar.

Claim 8 depends from Claim 1 and further sets forth that the C_xF_y gas is at least C_4F_6 , the oxygen containing gas is at least O_2 and the carrier gas is Ar, the etchant gas being supplied to the plasma etch reactor through a showerhead electrode at flow rates of 10 to 25 sccm C_4F_6 , 5 to 20 sccm O_2 and 50 to 300 sccm Ar.

As set forth below, the combination of Kadomura, Wang and Schmitt fails to teach or reasonably suggest all of the claim limitations.

2 - The Etch Reactor of Schmitt is Unsuitable for Kadomura's Process

Regarding Claim 1, Kadomura relates to a process wherein a high-density plasma etch reactor is used (column 3, lines 36-44). In fact, Kadomura specifically recites that the fluorocarbon etching gas is in the form of a high-density plasma because of dissociation which takes place more readily than in the case of conventional RF plasma under a low pressure. Column 4, lines 53-58. Schmitt relates to a capacitively coupled RF plasma reactor which does not provide a high density plasma. The plasma reactor of Schmitt would be unsuitable for Kadomura's high-density plasma etch process because it would change the principle of operation of Kadomura to use a capacitively coupled etch reactor to

carry out the modified Kadomura etch process. Accordingly, because the proposed modification to Kadomura would change the principle of operation of Kadomura, the teachings of Kadomura, Wang and Schmitt are not sufficient to render the claims *prima facie* obvious. See In re Ratti, 123 USPQ 349 (CCPA 1959). Additionally, the proposed modification to Kadomura, using the non-high density capacitively coupled RF plasma reactor of Schmitt, renders Kadomura unsatisfactory for its intended purpose. Thus, there is no suggestion or motivation to make the proposed modification. See In re Gordon, 221 USPA 1125 (Fed. Cir. 1984). As such, Claim 1 is patentable over Kadomura, Wang and Schmitt.

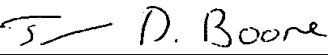
3 - Claims 7 and 8 Are Further Patentable

Applicants contend that the addition of oxygen to a hydrogen-free main etchant gas was not known from the teachings of Wang to achieve a recognized result and thus the amount of oxygen to add is clearly not a known result-effective variable. See In re Antonie, 195 USPQ 6 (CCPA 1977). As such, Claims 7 and 8 are further patentable over Kadomura, Wang and Schmitt.

In view of the foregoing, it is submitted that the present application is in condition
for allowance and such action is earnestly solicited.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

By:  D. Boone

Travis D. Boone
Registration No. 52,635

P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620

Date: February 6, 2004

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board

Paper No. 21

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MARIA D. ELLUL

Appeal No. 1997-4412
Application 08/372,539

ON BRIEF

Before KIMLIN, Administrative Patent Judge, and McKELVEY,
Senior Administrative Patent Judge, and PAWLIKOWSKI,
Administrative Patent Judge.

PAWLIKOWSKI, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 28, 29, 31-33, and 35-38. A copy of illustrative 28 is reproduced below:

28. A thermoplastic crystalline olefin polymer composition having a lowered glass transition temperature, consisting essentially of a C₃ polyolefin containing a low molecular weight aliphatic tallate ester plasticizer which is compatible with the polyolefin.



RECEIVED
FEB 19 2004

Appeal No. 1997-4412
Application 08/372,539

Claims 28, 29, 31-33, and 35-38 stand rejected under 35
U.S.C. § 112, first paragraph (written description).

For the reasons set forth below, we reverse.

OPINION

The examiner states that the specification is directed to a blend of a polyolefin and a rubber taken together with a plasticizer. (Answer, page 4). The examiner concludes that no support exists for a composition consisting essentially of a polyolefin and a plasticizer. (Answer, page 4). The examiner states that every example in the specification contains a rubbery component (Answer, page 7).

Appellant argues that the specification does convey to the artisan that separate phases of thermoplastic polyolefin and rubber were recognized by appellant. Appellant refers to page 1, lines 16-17, page 3, lines 5-6, page 6, lines 5-9, and page 13, lines 21-23 of the specification in this regard. (Brief, pages 3-4). Appellant also refers to the paragraph bridging pages 6-7, and to Tables 1, 2, 3, and 7 of the specification.

Appeal No. 1997-4412
Application 08/372,539

We have carefully reviewed the above-mentioned parts of the specification in search of a description of any phase containing only 2 components (polyolefin and an ester plasticizer). We find that the paragraphs bridging pages 6-7 provides such a description. This paragraph indicates that a polyolefin was immersed in an ester plasticizer in order to determine the compatibility between the ester plasticizer and the polyolefin. The subject matter of two components only are supported by this description. With respect to the other parts of the specification mentioned above, we cannot find such as description of any phase containing only 2 components, and hence agree with the examiner's comments with regard to these other parts of the specification.

In view of the description found in the paragraph bridging pages 6-7 of the specification, we find that appellant was in possession of the invention as claimed, and hence reverse the 35 U.S.C. § 112, first paragraph rejection.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

REVERSED

3

$$\begin{array}{c}) \\) \\) \\) \\) \\) \\) \\) \\) \\) \\) \\) \end{array}$$

)
)
)
)
)
)
)

)
)
)
)

))

4

Appeal No. 1997-4412
Application 08/372,539

BAP/cam

claim limitation”); *Kropa v. Robie*, 187 F.2d at 152, 88 USPQ2d at 480-81 (preamble is not a limitation where claim is directed to a product and the preamble merely recites a property inherent in an old product defined by the remainder of the claim); *STX LLC v. Brine*, 211 F.3d 588, 591, 54 USPQ2d 1347, 1350 (Fed. Cir. 2000) (holding that the preamble phrase “which provides improved playing and handling characteristics” in a claim drawn to a head for a lacrosse stick was not a claim limitation). >Compare *In re Cruciferous Sprout Litig.*, 301 F.3d 1343, 1346-48, 64 USPQ2d 1202, 1204-05 (Fed. Cir. 2002) (A claim at issue was directed to a method of preparing a food rich in glucosinolates wherein cruciferous sprouts are harvested prior to the 2-leaf stage. The court held that the preamble phrase “rich in glucosinolates” helps define the claimed invention, as evidenced by the specification and prosecution history, and thus is a limitation of the claim (although the claim was anticipated by prior art that produced sprouts inherently “rich in glucosinolates”).<

During examination, statements in the preamble reciting the purpose or intended use of the claimed invention must be evaluated to determine whether the recited purpose or intended use results in a structural difference (or, in the case of process claims, manipulative difference) between the claimed invention and the prior art. If so, the recitation serves to limit the claim. See, e.g., *In re Otto*, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963) (The claims were directed to a core member for hair curlers and a process of making a core member for hair curlers. Court held that the intended use of hair curling was of no significance to the structure and process of making.); *In re Sinex*, 309 F.2d 488, 492, 135 USPQ 302, 305 (CCPA 1962) (statement of intended use in an apparatus claim did not distinguish over the prior art apparatus). If a prior art structure is capable of performing the intended use as recited in the preamble, then it meets the claim. See, e.g., *In re Schreiber*, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997) (anticipation rejection affirmed based on Board’s factual finding that the reference dispenser (a spout disclosed as useful for purposes such as dispensing oil from an oil can) would be capable of dispensing popcorn in the manner set forth in appellant’s claim 1 (a dispensing top for dispensing popcorn in a specified

manner)) and cases cited therein. See also MPEP § 2112 - § 2112.02.

2111.03 Transitional Phrases

The transitional phrases “comprising”, “consisting essentially of” and “consisting of” define the scope of a claim with respect to what unrecited additional components or steps, if any, are excluded from the scope of the claim.

The transitional term “comprising”, which is synonymous with “including,” “containing,” or “characterized by,” is inclusive or open-ended and does not exclude additional, unrecited elements or method steps. See, e.g., *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501, 42 USPQ2d 1608, 1613 (Fed. Cir. 1997) (“Comprising” is a term of art used in claim language which means that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim.); *Moleculon Research Corp. v. CBS, Inc.*, 793 F.2d 1261, 229 USPQ 805 (Fed. Cir. 1986); *In re Baxter*, 656 F.2d 679, 686, 210 USPQ 795, 803 (CCPA 1981); *Ex parte Davis*, 80 USPQ 448, 450 (Bd. App. 1948) (“comprising” leaves “the claim open for the inclusion of unspecified ingredients even in major amounts”).

The transitional phrase “consisting of” excludes any element, step, or ingredient not specified in the claim. *In re Gray*, 53 F.2d 520, 11 USPQ 255 (CCPA 1931); *Ex parte Davis*, 80 USPQ 448, 450 (Bd. App. 1948) (“consisting of” defined as “closing the claim to the inclusion of materials other than those recited except for impurities ordinarily associated therewith.”). A claim which depends from a claim which “consists of” the recited elements or steps cannot add an element or step. When the phrase “consists of” appears in a clause of the body of a claim, rather than immediately following the preamble, it limits only the element set forth in that clause; other elements are not excluded from the claim as a whole. *Mannesmann Demag Corp. v. Engineered Metal Products Co.*, 793 F.2d 1279, 230 USPQ 45 (Fed. Cir. 1986).

The transitional phrase “consisting essentially of” limits the scope of a claim to the specified materials or steps “and those that do not materially affect the basic and novel characteristic(s)” of the claimed invention. *In re Herz*, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976) (emphasis in origi-

nal) (Prior art hydraulic fluid required a dispersant which appellants argued was excluded from claims limited to a functional fluid “consisting essentially of” certain components. In finding the claims did not exclude the prior art dispersant, the court noted that appellants’ specification indicated the claimed composition can contain any well-known additive such as a dispersant, and there was no evidence that the presence of a dispersant would materially affect the basic and novel characteristic of the claimed invention. The prior art composition had the same basic and novel characteristic (increased oxidation resistance) as well as additional enhanced detergent and dispersant characteristics.). “A ‘consisting essentially of’ claim occupies a middle ground between closed claims that are written in a ‘consisting of’ format and fully open claims that are drafted in a ‘comprising’ format.” *PPG Industries v. Guardian Industries*, 156 F.3d 1351, 1354, 48 USPQ2d 1351, 1353-54 (Fed. Cir. 1998). See also *Atlas Powder v. E.I. duPont de Nemours & Co.*, 750 F.2d 1569, 224 USPQ 409 (Fed. Cir. 1984); *In re Janakirama-Rao*, 317 F.2d 951, 137 USPQ 893 (CCPA 1963); *Water Technologies Corp. vs. Calco, Ltd.*, 850 F.2d 660, 7 USPQ2d 1097 (Fed. Cir. 1988). For the purposes of searching for and applying prior art under 35 U.S.C. 102 and 103, absent a clear indication in the specification or claims of what the basic and novel characteristics actually are, “consisting essentially of” will be construed as equivalent to “comprising.” See, e.g., *PPG*, 156 F.3d at 1355, 48 USPQ2d at 1355 (“PPG could have defined the scope of the phrase ‘consisting essentially of’ for purposes of its patent by making clear in its specification what it regarded as constituting a material change in the basic and novel characteristics of the invention.”). See also *In re Janakirama-Rao*, 317 F.2d 951, 954, 137 USPQ 893, 895-96 (CCPA 1963). If an applicant contends that additional steps or materials in the prior art are excluded by the recitation of “consisting essentially of,” applicant has the burden of showing that the introduction of additional steps or components would materially change the characteristics of applicant’s invention. *In re De Lajarte*, 337 F.2d 870, 143 USPQ 256 (CCPA 1964). See also *Ex parte Hoffman*, 12 USPQ2d 1061, 1063-64 (Bd. Pat. App. & Inter. 1989) (“Although ‘consisting essentially of’ is typically used and defined in the context of compositions of matter, we find nothing

intrinsicly wrong with the use of such language as a modifier of method steps. . . [rendering] the claim open only for the inclusion of steps which do not materially affect the basic and novel characteristics of the claimed method. To determine the steps included versus excluded the claim must be read in light of the specification. . . . [I]t is an applicant’s burden to establish that a step practiced in a prior art method is excluded from his claims by ‘consisting essentially of’ language.”).

OTHER TRANSITIONAL PHRASES

Transitional phrases such as “having” must be interpreted in light of the specification to determine whether open or closed claim language is intended. See, e.g., *Lampi Corp. v. American Power Products Inc.*, 228 F.3d 1365, 1376, 56 USPQ2d 1445, 1453 (Fed. Cir. 2000) (The term “having” was interpreted as open terminology, allowing the inclusion of other components in addition to those recited); *Crystal Semiconductor Corp. v. TriTech Microelectronics Int’l Inc.*, 246 F.3d 1336, 1348, 57 USPQ2d 1953, 1959 (Fed. Cir. 2001) (term “having” in transitional phrase “does not create a presumption that the body of the claim is open”); *Regents of the Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559, 1573, 43 USPQ2d 1398, 1410 (Fed. Cir. 1997) (In the context of a cDNA having a sequence coding for human PI, the term “having” still permitted inclusion of other moieties.). The transitional phrase “composed of” has been interpreted in the same manner as either “consisting of” or “consisting essentially of,” depending on the facts of the particular case. See *AFG Industries, Inc. v. Cardinal IG Company*, 239 F.3d 1239, 1245, 57 USPQ2d 1776, 1780-81 (Fed. Cir. 2001) (based on specification and other evidence, “composed of” interpreted in same manner as “consisting essentially of”); *In re Bertsch*, 132 F.2d 1014, 1019-20, 56 USPQ 379, 384 (CCPA 1942) (“Composed of” interpreted in same manner as “consisting of”; however, court further remarked that “the words ‘composed of’ may under certain circumstances be given, in patent law, a broader meaning than ‘consisting of.’ ”).

2112 Requirements of Rejection Based on Inherency; Burden of Proof

The express, implicit, and inherent disclosures of a prior art reference may be relied upon in the rejection